Chelsio 10GbE Adapters for IBM System Cluster 1350 and IBM iDataPlex

IBM System x at-a-glance guide

Chelsio single-port and dual-port adapters for IBM System Cluster 1350 and IBM iDataPlex are 10 Gigabit Ethernet adapters with PCI Express host bus interface optimized for virtualization, high performance computing, and storage applications. The third generation technology from Chelsio provides the highest 10GbE performance that is available and dramatically lowers host system CPU communications overhead.

With on-board hardware that off-loads TCP/IP, iSCSI, and iWARP RDMA processing from its host system, these adapters free up host CPU cycles for business applications and result in increased bandwidth, lower latency, and lower power. This combination makes it practical to converge other networks that traditionally used niche technologies onto 10GbE. High bandwidth and extremely low latency make 10GbE with protocol offload the best technology for high-performance cluster computing (HPCC) fabrics.

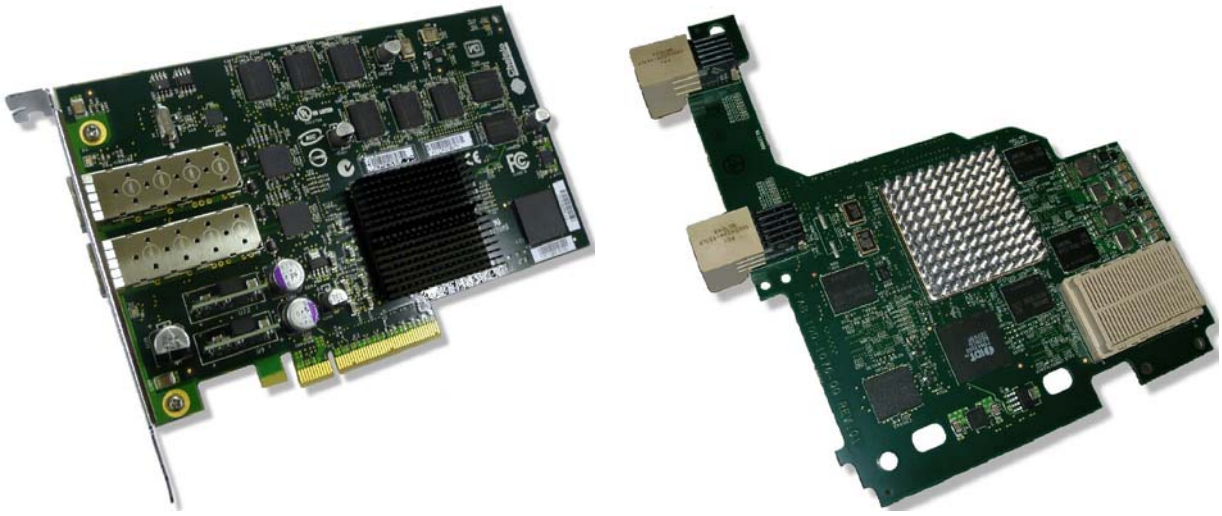

Figure 1. Chelsio dual-port 10GbE adapters: The S320E (left) and the 10GbE Expansion Card (CFFh) for IBM BladeCenter (right)

Did you know

These Chelsio adapters enable the concept of *unified wire*, the convergence of server networking, storage networking, and cluster computing interconnects onto a single platform and a single fabric.

These Chelsio adapters are part of the IBM System Cluster 1350 solution. The Cluster 1350 is your key to a fully integrated HPC solution. IBM clustering solutions include servers, storage, and industry-leading interconnects that are factory-integrated, fully tested, and delivered to your door, ready to plug into your data center, all with a single point of contact for support.

Part number information

Table 1. Ordering part number and feature code

Description	IBM part number	Feature code	Chelsio part number
Chelsio S310E Single-port 10GbE PCIe x8 Adapter	59Y1952	5761	S310E-CR
Chelsio S310E Single-port 10GbE PCIe x8 Adapter (SFP+ connector)	46M1809	5493	S310E-SR+
Chelsio S310E Single-port 10GbE PCIe x8 Adapter (CX4 connector)	46M1813	5494	S310E-CXA
Chelsio S320E Dual-port 10GbE PCIe x8 Adapter	59Y1956	5762	S320E-CR
Chelsio 10GbE Expansion Card (CFFh) for IBM BladeCenter	46M1817	5495	S320EM-BCH

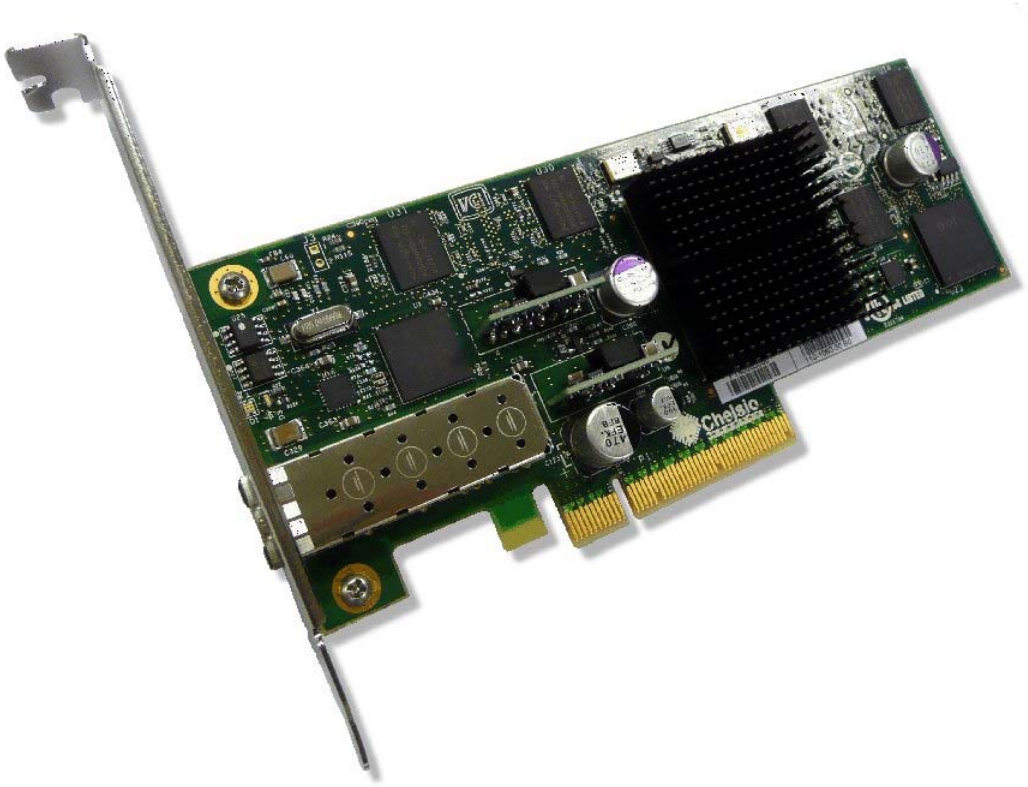

Figure 2. Chelsio S310E Single-port 10GbE PCIe x8 Adapter, 59Y1952

Features

These Chelsio single-port and dual-port adapters for IBM System 1350 and iDataPlex have following features:

- Unified Wire interconnect solution for server networking, storage networking, and clustering on a single platform
- Very low latency Ethernet
- Reduces host CPU utilization by up to 90% compared to NICs without full offload capabilities
- PCI Express 1.1 x8 host bus interface
- Line-rate 10Gbps full-duplex performance
- Integrated traffic manager, QoS, and virtualization capabilities
- TCP sockets, SCSI, RNIC-PI, kDAPL,and OpenFabrics 1.3 software interfaces
- Ideal fit for scale up servers and NAS systems
- Consolidate LAN, SAN, and cluster networks
- Enable high performance NAS systems and Ethernet-based IP SANs
- Deploy Ethernet-only IP SANs throughout the enterprise beyond the data center
- Develop shared-storage systems providing both file- and block-level services
- Deploy Ethernet-only networking for cluster fabric, LAN, and SAN
- Full TCP offload, iSCSI, and iWARP RDMA plus direct data placement (DDP)
- Increase cluster fabric bandwidth and deploy Ethernet-only networking for cluster fabric, LAN, and SAN

Table 2 compares the adapters.

Table 2. Comparison of the adapter cards

Feature	Single-port CR	Single-port SR+	Single-port CXA	Dual-port CR	Dual-port CFFh
Part number	59Y1952	46M1809	46M1813	59Y1956	46M1817
Form factor	Low profile PCIe card	Low profile PCIe card	Low profile PCIe card	Half-length PCIe card	BladeCenter CFFh
Ports	1	1	1	2	2
Connector(s)	SFP+ cage*	SFP+	CX4	SFP+ cage*	CFFh connector
Power consumption	16.7 W	17 W	16 W	21.7 W	16 W

* These cards support the use of SFP+ transceivers or twinax direct-attach cables (DACs)

Figure 3. Chelsio S310E Single-port 10GbE PCIe x8 Adapter (CX4 connector), 46M1813

Specifications

The Chelsio single-port and dual-port adapters for Cluster 1350 and iDataPlex have the following features:

Network Interfaces:

- 10GBASE-SR short-reach optics (850nm)
- 10GBASE-LR long-reach optics (1310nm)
- 10GBASE-CX short-reach copper

Ethernet:

- IEEE 802.3ae (10GbE)
- IEEE 802.1p Priority and 802.1Q VLAN tagging
- IEEE 802.3x flow control
- IEEE 802.3ad link aggregation
- Ether II and 802.3 encapsulated frames
- Multiple MAC addresses per interface
- Jumbo Frames up to 9.6 KB

Stateless Offloads:

- TCP checksum offload for IPv4 & IPv6
- TCP Segmentation Offload (TSO) for IPv4 & IPv6
- Large Receive Offload (LRO) for IPv4 & IPv6
- Large Send Offload (LSO) for IPv4 & IPv6
- UDP checksum offload for IPv4 & IPv6
- Receive Side Scaling and packet steering
- Line rate packet filtering and attack protection

TCP/IP Full Offload:

- Full TCP implementation including exceptions
- High performance even during packet loss
- Extensive RFC compliance, fully featured stack
- Zero copy on Tx and Rx
- Direct Data Placement (DDP)
- Up to 64 K simultaneous connections capacity

Integrated Traffic Manager:

- Multiple Tx & Rx queues with QoS
- Simultaneous low latency and high bandwidth
- Per-connection and per-class rate control
- Packet loss avoidance

Virtualization and Firewall:

- Rule-based packet steering and filtering capability

iSCSI Acceleration:

- Full iSCSI initiator and target mode stack
- Header and Data Digest (CRC) generation and checking
- PDU recovery
- Direct Data Placement (DDP)

High Performance RDMA:

- Ultra-low latency, line rate bandwidth
- IETF RDDP and RDMAC iWARP compliance
- APIs: RNIC-PI, kDAPL and OpenFabrics 1.3

Physical specifications

The three single-port adapters have the following physical specifications:

- Width: 168 mm (6.60 in)
- Height: 64 mm (2.52 in)
- Depth: 18 mm (0.69 in)

The S320E dual-port 10GbE adapter has the following physical specifications:

- Width: 168 mm (6.60 in)
- Height: 107 mm (2.52 in)
- Depth: 18 mm (0.69 in)

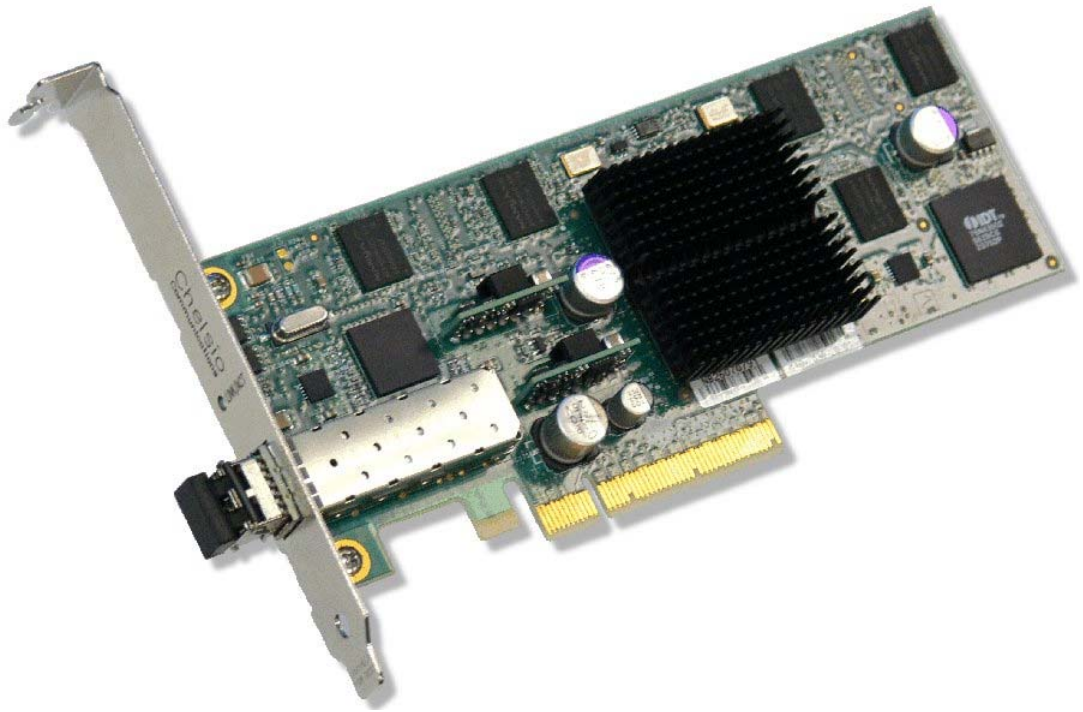

Figure 4. Chelsio S310E Single-port 10GbE PCIe x8 Adapter (SFP+ connector), 46M1809

Operating environment

This adapter is supported in the following environment:

- Temperature (operating): 0° to 55° C (32° to 131° F)
- Humidity (operating): 5 to 95%, non-condensing
- Airflow: 200 lf/m

Supported servers

The Chelsio single-port and dual-port adapters are supported in the IBM servers that are listed in Table 3.

Table 3. Supported servers in the 1350 program

	Part number	x3550 M2	x3650 M2	x3755	iDataPlex dx360 M2	HS22	LS22	LS42	JS23/JS43
Chelsio S310E Single-port 10GbE PCIe x8 Adapter	59Y1952	Y	Y	Y	Y	N	N	N	N
Chelsio S310E Single-port 10GbE PCIe x8 Adapter (SFP+ connector)	46M1809	Y	Y	Y	Y	N	N	N	N
Chelsio S310E Single-port 10GbE PCIe x8 Adapter (CX4 connector)	46M1813	Y	Y	Y	Y	N	N	N	N
Chelsio S320E Dual-port 10GbE PCIe x8 Adapter	59Y1956	Y	Y	Y	Y	N	N	N	N
Chelsio 10GbE Expansion Card (CFFh) for IBM BladeCenter	46M1817	N	N	N	N	Y	Y	Y	Y

Supported operating systems

The Chelsio adapters support the following operating systems (including support for both TOE and NIC mode, unless otherwise stated):

- FreeBSD
- Kernel.org Linux-2.6.9, 2.6.12, and 2.6.20
- Red Hat Enterprise Linux 3 base kernel (NIC only, no TOE support).
- Red Hat Enterprise Linux 4 U3, U4, U5, U6, U7, and U8
- Red Hat Enterprise Linux 5 base, U1, U2, U3, and U4
- Solaris and Open Solaris
- SUSE Linux Enterprise Server 9 SP3 (NIC only, no TOE support)
- SUSE Linux Enterprise Server 10 base, SP1, SP2 and SP3
- SUSE Linux Enterprise Server 11 base
- Microsoft Windows Server 2003 SP2 (x64)
- Microsoft Windows Server 2008 R2 (x64)
- VMware ESX/ESXi 3.5
- VMware ESX/ESXi 4.0

See Chelsio driver README file for the latest information about the specific versions and service packs that are supported, available from:

http://www.chelsio.com/support

Related publications

For more information, refer to these resources:

- Chelsio Adapters driver download, Installation, Configuration, troubleshooting, support
  http://service.chelsio.com/ibm.html
- IBM iDataplex and Cluster 1350 - Drivers, Firmware, and Software (Red Hat 5.3)
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5082806
- IBM Announcement Letter
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS108-880
- IBM Announcement Letter
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS109-722
- IBM System Cluster 1350 Information Center
  http://publib.boulder.ibm.com/cluster/

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